

U.S. Patent Application Serial No. **09/926,824**
Response dated August 19, 2003
Reply to OA of **March 19, 2003**

REMARKS

Claims 1 and 3-12 are pending in this application. Claim 2 has been canceled without prejudice or disclaimer. Claims 1, 3 and 12 have been amended herein. No new matter has been added.

Claim 1 has been amended to recite that the rubber composition comprises both the crosslinking agent (C_A) for the nitrile rubber and crosslinking agent (C_B) for the epihalohydrin rubber. Basis for this amendment may be found in the specification on page 8, lines 4-2 from the bottom.

In addition, claim 1 has been amended to have the limitation of cancelled claim 2, of the amount of nitrile rubber (A) being in the range of 45 to 70%.

Claim 3 has been amended to be grammatically consistent with claim 1.

Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Starmer (U.S. Patent No. 4,408,261) (Office action point no. 2).

The rejection of pending claims 1 and 3-11 is overcome by the amendment to claim 1. The difference between the rubber composition of the present invention as claimed in amended claim 1 and that of Starmer is as follows.

Starmar discloses a rubber composition comprised of a polyblend of a halogen-containing polymer and a diene/nitrile rubber having active halogen cure sites covulcanized using a common cure system.

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In contrast, the rubber composition of the present invention as claimed in amended claim 1 comprises a polyblend of a nitrile rubber (A) and epihalohydrin rubber (B), and two kinds of crosslinking agents, i.e., a crosslinking agent (C_A) for the nitrile rubber (A) and a crosslinking agent (C_B) for the epihalohydrin rubber (B). That is, a common cure system is not used in the rubber composition of the present invention.

Applicants respectfully submit that pending claims 1 and 3-11, as amended, are not anticipated by Starmer. Reconsideration of the rejection is respectfully requested.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Starmer (U.S. Patent No. 4,408,261) (Office action point no. 4).

The rejection of claim 12 is overcome by the amendments to the claims. Applicants submit that amended claims 1 and 3 to 11, as well as claim 12, are not obvious over Starmer for the following reasons.

Applicants have noted above in regard to the rejection under 35 U.S.C. 102(b) that the rubber composition of claims 1 and 3-11 of the present invention differs from that disclosed in Starmer in that a common cure system is not used in the rubber composition of the present invention. Further, it is not essential whether the nitrile rubber (A) used in the present invention has or does not have active halogen cure sites.

Further, the nitrile content in the nitrile rubber (A) used in the present invention is very narrow, i.e., in the range of 45 - 55 % by weight. In contrast, the nitrile content in the nitrile rubber

of Starmer is in the range of 15 - 49% by weight. Applicants note that Starmer specifically discloses only two kinds of nitrile rubbers, one having a nitrile content of 32% and the other having a nitrile content of 44%, in the working examples, both of which are outside the recited range of 45 - 55% by weight in the present invention.

Among the rubber compositions specifically disclosed in the working examples of Starmer '261 patent, the following three rubber compositions (1), (2) and (3) appear relatively relevant to the present invention:

Rubber Composition (1) (Example II, Run No. 3 in Table in columns 9-10 in Starmer '261 patent) comprising 50% by weight of 66% butadiene/32%acrylonitrile/2% vinyl benzyl chloride copolymer rubber and 50% by weight of epichlorohydrin copolymer rubber, and 1.5% (based on the weight of the rubber ingredients) of a co-curing agent.

Rubber Composition (2) (Example II, Run No. 7 in Starmer '261 patent) comprising 25% by weight of 53% butadiene/44% acrylonitrile/3% vinyl benzyl chloride copolymer rubber and 75% by weight of epicholorohydrin copolymer rubber, and 1.5% of a co-curing agent.

Rubber Composition (3) (Example II, Run No. 8 in Starmer '261 patent) comprising 75% by weight of 53% butadiene/44% acrylonitrile/3% vinyl benzyl chloride copolymer rubber and 25% by weight of epicholorohydrin copolymer rubber, and 1.5% of a co-curing agent.

Applicants note that rubber composition (1) comprises a nitrile rubber with a nitrile content of 32%, which is below the range of 45 - 55% by weight in the present invention. Rubber compositions (2) and (3) comprise a nitrile rubber with a nitrile content of 44%, which is slightly

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below the range of 45 - 55 % by weight in the present invention, and the proportion of the nitrile rubber to the epihalohydrin rubber in (2) and (3) are 25/75 and 75/25, which are outside the range 45 - 70% of the present invention.

In addition, Applicants further argue that the rubber composition for hose of the present invention provides unexpected and surprising results over Starmer. Applicants here attach a Declaration under 37 CFR 1.132 by co-inventor Shigera Fujita, providing data on experiments conducted on rubber compositions (1), (2) and (3) of Starmer.

The data in the Declaration demonstrate that rubber compositions (1), (2) and (3) specifically disclosed in Starmer gave hoses exhibiting poor resistance to permeation to fuel oil or poor cold resistance, as compared with rubber compositions of the present invention.

Applicants note that Starmer teaches nothing about enhancement of resistance to permeation to fuel oil and cold resistance, and the improved resistance to permeation of fuel oil and cold resistance achieved by the rubber composition of the present invention are therefore unexpected and surprising over the reference.

Applicants therefore assert that claims 1 and 3-12, as amended, are novel and non-obvious over Starmer '261.

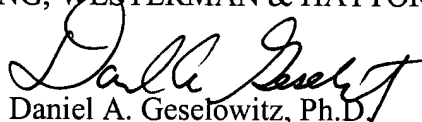
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If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP


Daniel A. Geselowitz, Ph.D.
Agent for Applicants
Reg. No. 42,573

DAG/plb
Atty. Docket No. **011755**
Suite 1000
1725 K Street, N.W.
Washington, D.C. 20006
(202) 659-2930



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PATENT TRADEMARK OFFICE

Enclosures: Declaration under 37 CFR 1.132

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IN THE CLAIMS:

Please cancel claim 2 without prejudice or disclaimer.

Please amend claims 1, 3 and 12 as follows:

1. (Currently Amended): A rubber composition for a hose, which comprises a nitrile rubber (A) comprising 45 to 55% by weight of α,β -ethylenically unsaturated nitrile monomer units and 55 to 45% by weight of conjugated diene monomer units, an epihalohydrin rubber (B), and ~~at least one crosslinking agent selected from the group consisting of~~ a crosslinking agent (C_A) for the nitrile rubber (A) and a crosslinking agent (C_B) for the epihalohydrin rubber (B); the amount of the nitrile rubber (A) being in the range of ~~25 to 80%~~ 45 to 70% by weight based on the sum of the nitrile rubber (A) and the epihalohydrin rubber (B).

2. (Canceled).

3. (Currently Amended): The rubber composition according to claim 1, wherein the total amount of ~~at least one crosslinking agent selected from the group consisting of~~ the crosslinking agent (C_A) for the nitrile rubber (A) and the crosslinking agent (C_B) for the epihalohydrin rubber (B) is in the range of 0.1 to 8 parts by weight based on 100 parts by weight of the sum of the nitrile rubber (A) and the epihalohydrin rubber (B).

4. (Previously Presented): The rubber composition according to claim 1, wherein the nitrile rubber (A) has a Mooney viscosity of 25 to 100.

5. (Previously Presented): The rubber composition according to claim 1, wherein the α,β -ethylenically unsaturated nitrile monomer is acrylonitrile or methacrylonitrile.

6. (Previously Presented): The rubber composition according to claim 1, wherein the conjugated diene monomer is 1,3-butadiene, 2-methyl-1,3-butadiene, 1,3-pentadiene or 2-chloro-1,3-butadiene.

7. (Previously Presented): The rubber composition according to claim 1, wherein the epihalohydrin rubber (B) has a Mooney viscosity of 30 to 140.

8. (Previously Presented): The rubber composition according to claim 1, wherein the epihalohydrin rubber (B) is a copolymer of an epihalohydrin monomer and an unsaturated epoxide monomer.

9. (Original): The rubber composition according to claim 8, wherein the epihalohydrin monomer is epichlorohydrin.

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10. (Previously Presented): The rubber composition according to claim 1, wherein the crosslinking agent (C_A) for the nitrile rubber is at least one crosslinking agent selected from the group consisting of a sulfur-containing crosslinking agent and an organic peroxide crosslinking agent.

11. (Previously Presented): The rubber composition according to claim 1, wherein the crosslinking agent (C_B) for the epihalohydrin rubber is at least one crosslinking agent selected from the group consisting of a thiourea, a triazine, a quinoxaline and an amine.

12. (Currently amended): A hose having a layer comprised of a crosslinked product of the rubber composition as claimed in any one of claims 1 and 3 to 10.